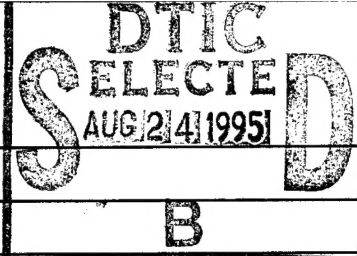


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THE RAZOR'S EDGE: IDENTIFYING THE OPERATIONAL
CULMINATING POINT OF VICTORY

by

George S. Webb
Colonel, U.S. Army

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Joint Military Operations Department.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: George S. Webb

9 March 1996

Paper directed by
Captain D. Watson
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INTRODUCTION

King Henry: How now! What means this, herald? Know'st thou not that I have fined these bones of mine for ransom? Comest thou again for ransom?

Montjoy: No, great King. I come to thee for charitable license, that we may wander o'er this bloody field to book (list) our dead, and then to bury them....

King Henry: I tell thee truly, herald, I know not if the day be ours or no, for yet a many of your horsemen peer and gallop o'er the field.

Montjoy: The day is yours.

King Henry: Praised be God, and not our strength, for it! What is this castle called that stands hard by?

Montjoy: They call it Agincourt.

King Henry: Then call we this the field of Agincourt, fought on the day of Crispin Crispianus.

Henry V¹

In this passage, William Shakespeare offers a conversation which may have taken place in the final minutes of the 1415 Battle of Agincourt. The decisive and overwhelming victory of the small English army over the French stands even today as one of the major turning points in land warfare. Nonetheless, as King Henry V receives the French herald Montjoy, he is unsure about the outcome of the battle. Not until Montjoy proclaims Henry and the English as victors is the outcome settled; then, according to the custom of the time, the victor seals it by naming the battle.

However accurate, this exchange invites a compelling question: How, on the field of battle, does one know if he has won, and when does he know it? In our world, stories are played out in nine innings, four quarters, or sixty minutes of television. There is no uncertainty over the outcome, for the scoreboard tells the tale. Battles are entirely different, of course. It is the rare commander, on either side, who clearly sees the outcome at the point when it is decided.^{*} Indeed, small tactical battles and engagements, once fought to a conclusion in an afternoon, have

^{*} For this paper, the battle "is decided" at that precise point where its outcome is a given and is irreversible. As this paper points out, it is seldom clear to the participants. The fight is not *decided* when all parties conclude with a truce.

expanded into campaigns and major operations lasting months and even years. The uncertainty grows.

In battles of antiquity, losing armies would cast their shields and weapons into piles to signify their defeat. Captured "eagles" or colors helped commanders gauge the fight. Usually, as depicted in the dialogue at Agincourt, the losing army asked the victor for permission to recover its dead.² Ultimately, the clearest signal of victory, however fleeting, was when the loser simply left the field.^{b3} Today we use satellites and electronic platforms to scan the battlefield. Even fights at the National Training Centers are played back with computer simulations. Information is passed as real-time or near-real-time. Nonetheless, commanders are hard pressed to answer the question, even in retrospect, "When did you know you had won (or lost), and how did you know it?" If the *tactical* outcome has become uncertain, the result at the *operational* level of war is all the more difficult to see. First, it appears that in earlier ages, the loser came forward to admit defeat. Today, and particularly at the operational level, the loser may not realize his imminent defeat, so the "offer" is never made. And secondly, generalship at the operational level requires one to function in a far more uncertain and abstract environment with infinitely more variables. How is the operational commander to know if he has won or lost? This paper seeks to explore this question. It is not about *how* to win; it is about knowing *if and when* one has won.^c

^b There are usually "signs" when an army leaves the field of battle in defeat, and this paper will examine them. In the Napoleonic era, for example, soldiers carried all their possessions in their knapsacks. Paddy Griffith points out that, "When an unit involuntarily abandoned its knapsacks, therefore, it was a sure sign that it had been truly beaten."

^c The terms "armies" and "generals" are used for convenience when speaking of campaigns; they do not imply only a land component. Clearly the operational level of war is a joint enterprise.

BACKGROUND

*No matter how highly rated the qualities of courage and steadfastness may be in war...there is a point beyond which persistence becomes desperate folly, and can therefore never be condoned. In that most famous of all battles, Belle-Alliance (Waterloo), Napoleon staked his last remaining strength on an effort to retrieve a battle that was beyond retrieving; he spent every last penny and then fled like a beggar from the battlefield and the Empire."*⁴

The question is not simply an idle one. Only in the worst instances of exhaustion style warfare--Verdun is an example--do armies stand and fight until one side can stand no longer. The losing commander often elects to preserve what he can of his force so that it can return to fight again. The winning commander recognizes that there is a "battle after the battle" in which exploitation and pursuit produce results far greater than the initial attack.⁵ But by not leaving the field early enough, the defeated leader may see his army destroyed. By pressing the pursuit too far, the prevailing side may set up the conditions for its own defeat as its combat power falls below the foe's. Clausewitz cautions us about the pursuit: "...one must know the point to which it can be carried out in order not to overshoot the target; otherwise instead of gaining new advantages, one will disgrace oneself."⁶ For the loser, the lesson is equally clear: "But each engagement reaches a point where it may be regarded as decided...The accurate perception of that point is very important in order to decide whether reinforcements would be profitably employed in renewing the action. New troops are often vainly sacrificed in an engagement that is past retrieving...."⁷

This phenomenon is described in part by his concept of the culminating point. Army Field Manual FM 100-5 defines it succinctly:

*"Unless it is strategically decisive, every offensive operation will sooner or later reach a point where the strength of the attacker no longer significantly exceeds that of the defender, and beyond which continued offensive operations therefore risk overextension, counterattack, and defeat. In operational theory, this point is called the culminating point."*⁸

US military officers appear to have a fairly clear understanding of the culminating point, so this paper will not dwell on defining it further even though its application can be complex. Rather, the focus will be on identifying the culminating point in stride.

COL George Hall suggests that there are four reasons why commanders historically have passed their culminating points: (1) losses at a lower level are justified to ensure success at a higher level, (2) "mistaken notions of heroism," (3) "obsession and egotism," and (4) "the difficulty of perceiving the the culminating point, particularly in pitched battles."⁹ It is this last reason that we will examine--the notion that seeing the point is exceedingly difficult if possible at all. Again, Clausewitz warns, "If we remember how many factors contribute to an equation of forces, we will understand how difficult it is in some cases to determine which side has the upper hand. Often it is entirely a matter of imagination. What matters therefore is to detect the culminating point with discriminative judgement."¹⁰ One might look at it antithetically from the vogue perspective on pornography: in the case of the culminating point, one *can* define it; we simply *don't know it when we see it*.

THE DOCTRINE

"Once a major operation or campaign starts, the operational commander must sense when he has reached or is about to reach his culminating point, whether intended or not, and if required shift to the defense at a time and place of his choosing. The ability to prevent one's own culmination while causing the enemy to reach his is one of the keys to operational success. The maintenance of one's own combat power is the key for success. However, this is very hard to do in the face of strong enemy resistance. In general, one of the most difficult tasks of the operational commander is to predict or identify the culminating point of victory."¹¹

M.N. Vego
US Naval War College

One might expect our doctrinal manuals to aid planners and operators in this quest for identifying the culminating point. In fact, however, they are of little help. Vego's advice above is typical of what one gets--counsel to seek out the culminating point and a caution on how difficult it is to do so. One finds little mention of how to see it. This is somewhat understandable given the complexity of the task, but it poorly serves the operational commander.

Joint Pub 3-0, Doctrine for Joint Operations, discusses the importance of conflict termination, though in general terms. Typical is the vague guidance, "The basic element of this goal is gaining control over the enemy in the final stages of combat. When friendly forces can freely impose their will on the enemy, the opponent may have to accept defeat, terminate active hostilities, or revert to other types of conflict...."¹² The manual goes on to discuss the culminating point, defining and endorsing it, but neglecting to offer a detailed explanation on how the commander is to see it. It does address *combat assessment*, which it calls "the overall effectiveness of force employment during military operations," but it then states that *battle damage assessment* (BDA) is a key component of combat assessment.¹³ This perspective

suggests a firepower orientation--high on information but low on analysis.^d

There is one glimmer of appropriate advice to planners and analysts when Joint Pub 3-0 says that at the joint level, analysis should determine "...what physical attrition the adversary has suffered; what effects the efforts have on the adversary's plans or capabilities; and what, if any, changes or additional efforts need to take place to meet the objectives of the current major operations or phase of the campaign."¹⁴ This counsel could lay the seed for helping the commander identify the operational culminating point, but it stops short.^e

Joint Pub 5-00.1, JTTP for Campaign Planning, advises, "Campaign plans must recognize probable culmination and identify ways to extend it," but it also neglects to say how.¹⁵ It is almost as if joint doctrine writers have signed up for the concept of the culminating point but don't understand it enough to go further. This manual does at least endorse the notion of a running assessment: "Once (military) objectives are determined, they are subjected to continuous review with respect to the enemy and changing situations to ensure that they remain relevant."¹⁶ This indeed is a first step in applying the tactical Intelligence Preparation of the Battlefield (IPB) concept to campaign planning and assessment of the culminating point. However, while the manual does address the need for "ongoing situation development," it needs to include during this

^d Joint Pub 5-00.1, JTTP for Campaign Planning, mentions that "...traditional bomb damage assessment has evolved through BDA to CA...to determine if required effects on the adversary envisioned in the campaign plan are being achieved." Then it backtracks by showing CA includes BDA, munitions effectiveness assessment, and reattack recommendations. It only briefly mentions the need to evaluate maneuver, air operations, fires, EW, C2W, and PSYOPS as well. (p. IV-18).

^e These two passages, combat assessment and analysis, are repeated verbatim in Joint Pub 2-0, Joint Doctrine for Intelligence Support to Operations, pp. VI 12-13. This latter manual arguably should present more detailed guidance for the intelligence analyst, but it fails to do so.

ongoing period a review of enemy intentions, probable enemy courses of action, and a predictive assessment. More specifically, it should require the J2 to participate in an assessment of the culminating point and should task him with certain Commander's Critical Information Requirements (CCIR) in that regard.

Army Field Manual 100-5 comes much closer to aiding the commander in identifying the culminating point, perhaps because the original authors of AirLand Battle doctrine strongly embraced Clausewitzian theory. The 1986 version devoted an appendix to a discussion of the culminating point, and it goes to some length to list the *reasons* for its strategic or operational cause.^f They are:¹⁷

1. Logistics: the "forward movement of supplies may be insufficiently organized" or stocks or transport may be inadequate.
2. The need to guard one's own Lines of Communications (LOC's) consumes one's own combat troops.
3. One may experience the loss of combat forces or other resources.
4. The defender will likely choose more defensible terrain.
5. Soldiers may become "physically exhausted and morally less committed as the attack progresses."
6. The defender may show increased determination.
7. The defender may get new allies, particularly as his situation deteriorates.
8. "A commander could outrun his current intelligence in an attack that moves faster and farther than planned."^g

Interestingly, neither the 1986 nor the 1993 manual discusses indicators of a culminating point in the sections devoted to that topic. The latter text, however, does indeed offer a clue

^f *Reasons* are not the same as *indicators*. Nonetheless, they are a good start point for research.

^g This last reason was not in the 1986 version of FM 100-5 but does appear in the 1993 manual. On the other hand, the potential for a desperate defender to "go nuclear" was mentioned in 1986 but removed in 1993. These modifications likely are efforts on the parts of the authors to maintain relevance between theory and current practice.

when it describes the *exploitation* and cautions units to seek signs that the conditions are appropriate for it. "Events such as increased EPWs (Enemy Prisoners of War), enemy units disintegrating after initial contact, lack of organized defense, and capture of or absence of enemy leaders all signal to the attacking units their opportunity to transition to exploitation."¹⁸ Similarly, the manual states that, "If it becomes apparent that *enemy resistance has broken down entirely* and the enemy is *fleeing the battlefield* (emphasis added), " a pursuit may be in order."¹⁹ One might suggest, then, that the absence of indicators such as these could imply either that the culminating point has not yet been reached (because the operation has not progressed far enough) or that the attacker has passed it (in which case he is well advised to cease his attack and assume the defense himself).

In short, doctrinal manuals laud the notion of the culminating point but provide few clues to the operational commander on when he is reaching it. It seems that in order to continue the search, one must resort to theory.

THE THEORY OF THE CULMINATING POINT

Since Clausewitz expressed the concept of the culminating point, it is appropriate to resume the search there. Clausewitz finished only Book 1 of On War to his satisfaction, so his "clues" to seeing the culminating point are somewhat elusive if not contradictory. He cautions that "...the point of culmination will necessarily be reached when the defender must make up his mind and act, when the advantages of waiting have been completely exhausted. There is of course no infallible means of telling when that point has come...."²⁰ Having established his caveat, he offers

hints, clues, and outright answers throughout the book. These include:

*"In deciding whether or not to continue the engagement, it is not enough to consider the loss of men, horses, and guns; one also has to weigh the loss of order, courage, confidence, cohesion, and plan. The decision rests chiefly on the state of morale...."*²¹

*"The ratio of physical loss on either side is in any case hard to gauge in the course of an engagement; but this does not apply to loss of morale....As a rule, then, loss of ground and lack of fresh reserves are the two main reasons for retreat (since these are indicators of a loss of morale)."*²²

*"In a major battle more than any other type of engagement, the decision to give up the fight depends on the relative strength of unused reserves still available."*²³

*"Losses incurred during the battle consist mostly of dead and wounded; after the battle they are usually greater in terms of captured guns and prisoners (which) are usually only found on one side....That is why guns and prisoners have always counted as the real trophies of victory."*²⁴

One can see from these examples that Clausewitz establishes both a physical and a moral dimension to the assessment of the fight and the identification of the culminating point and victory. Elsewhere he states that if the purpose of the engagement is to capture a mobile object, then it is decided when the object is lost. If the purpose is to capture terrain or a fixed object, "the decisive moment is usually...when the locality is lost." These are simple. If the purpose is to destroy an enemy force, however, "...the moment of decision comes when the victor ceases to be in a state of disarray...Thus an engagement cannot be retrieved if the attacking force has lost little if any of its cohesion and effectiveness...while the defender has become more or less disorganized."²⁵

Ultimately Clausewitz addresses what he calls "a change in equilibrium." He says, "The outcome of a battle as a whole is made up of the results of its constituent engagements; these in turn may be recognized by three distinct signs." Closely linked with the morale and physical

perspectives cited above, these signs for assessing the direction of the battle are among his clearest clues:

1. **"...the psychological effect exerted by the commanding officer's moral stamina."**

In this case he is describing how the general perceives his subordinate commander's morale through the tone and facts of the latter's reports. If the subordinate manifests worry or loss of morale, the general should notice this signal.

2. **"...a wasting away of one's own troops at a rate faster than that of the enemy's."**

Obviously he is describing attrition rates; in today's terms one would consider troops, weapons systems, and logistics when assessing loss ratios. This is a physical indicator.

3. **"The third is the amount of ground lost."** On the surface, this also appears physical, but it probably has a moral dimension as well, as yielding ground could suggest a loss of resolve.

Finally Clausewitz summarizes with, "All these indicators serve as a kind of compass by which a commander can tell the direction in which his battle is going."²⁶

Similarly, and more concisely, he states that the "total concept of victory" has three components:

- "1. The enemy's greater loss of material strength.**
- 2. His loss of morale.**
- 3. His open admission of the above by giving up his intentions."²⁷**

It would appear that these last two paragraphs offer the clearest indicators of victory and the culminating point. The lists are quite similar, and both address the physical and the moral perspectives. While Clausewitz intended the first list to explain how a commander might gauge

the flow of the battle and the second to identify the point of victory, those are in many respects the same.

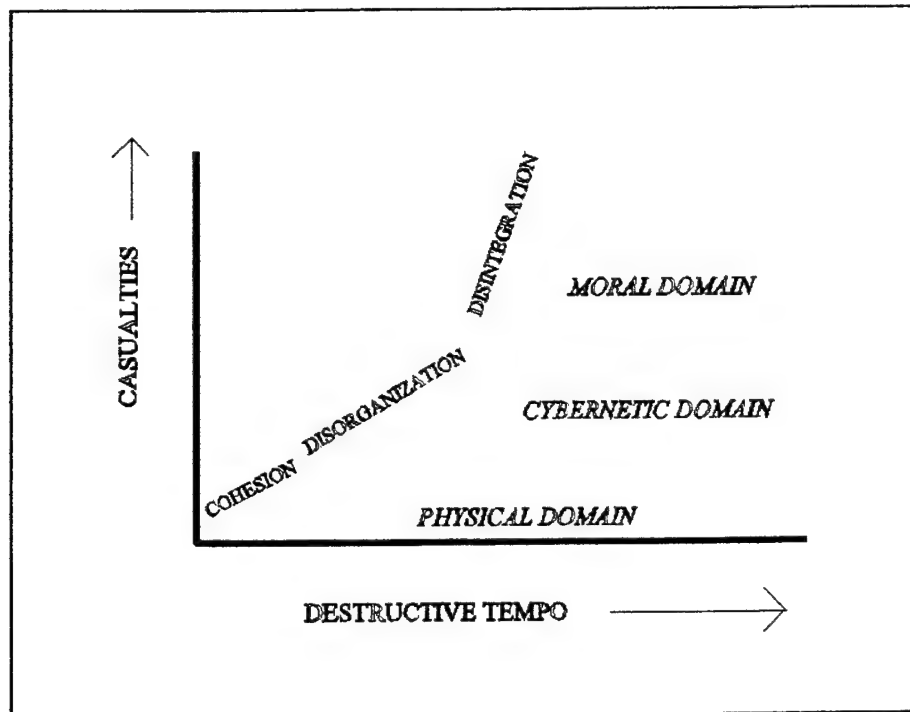
Each of Clausewitz's citations shown has special nuances which must be taken together to form a picture of the whole. Otherwise, the reader would but look for a checklist, a list which isn't to be found. The identification of the culminating point is an art as well as a science with both a moral and a physical perspective. But those may not always be clear, so Clausewitz offers a third perspective on discerning the culminating point. If one recalls that he said the capture of enemy prisoners and guns--trophies--is an indicator of faltering enemy morale, then he is easy to understand when he says, "Trophies apart, there is no accurate measure of loss of morale; hence in many cases the abandonment of the fight remains the only authentic proof of victory."²⁸

THE MORAL DOMAIN

"War is not only a contest of weapons, but also a contest of will power. The contest of will power mounts relatively to the contest of weapons. Wherever the contest of weapons has reached a climax and the issue is about to be decided, or whenever all reserves are spent and the operation is about to enter a critical phase, the climax of the contest of will power must not always be allowed to coincide with that of the contest of weapons but must frequently be carried further. At the moment when the contest of weapons has reached its climax, the impact of influences originating from the situation and from other sources upon the commander is most severe. It is then--so to speak, during the last quarter hour--that the commander must remain firm to the last, calm and resolute."

Generaloberst Lothar Rendulic²⁹

Dr. James Schneider offers a model which may prove helpful in analyzing Clausewitz and the moral domain. Schneider graphically illustrates his point as depicted below:³⁰



When battles unfold, Schneider says that armies will undergo transformations as casualties and destructive tempo increase. Initially armies (or subunits thereof) exist in the physical domain in a state of cohesion; soldiers and equipment operate more or less as they are intended. As units experience casualties, however, a certain degree of disorganization ensues. This cybernetic domain is mostly manifested by degradation in command, control, communications, and information systems. The units still perform, but at a degraded level. In reality, all units operate at best in the lower end of the scale of disorganization, but they function quite efficiently. With increased casualties, however, routine functions become more and more difficult. Finally, at the highest end of the scale, in what Schneider calls the moral domain, units begin to experience disintegration. They start to collapse and ultimately lose their will to fight.

The distinction between disorganized and disintegrating units is critical to understanding Clausewitz's focus on morale and the culminating point. As Schneider points out, "A disorganized force generally still bears the will to fight. Once disintegration sets in, the army rapidly loses all effectiveness and simply becomes a target." It is this collapse, this loss of the will to fight, that Clausewitz meant when he talked about "trophies,"³¹ prisoners and guns, that serve as indicators of how a battle is going. Prisoners are captured because they cannot or will not fight any longer. Guns (he really meant cannons) are captured when a fleeing army has lost either the desire or ability to recover them. And as mentioned in FM 100-5, the capture of enemy leaders (or their absence on the battlefield) also suggests disintegration.^h

To be sure, different units function along different parts of the scale at different times. As casualties increase, or as the rate of losses increases, they move up the scale; as they recover, they move back down the scale. Furthermore, different units can endure at different levels; some German SS units in World War II continued to function effectively at incredibly low strength levels, while other organizations disintegrated at levels where they should not have. At some point, however, any organization will collapse; even the vaunted Merrill's Marauders ultimately disintegrated. The key is to observe the battle with a critical eye, seeking evidence that one side or the other has reached that critical step taking it from disorganization to disintegration. One must place Clausewitz's "prisoners and guns" in a modern context, but the application is yet the

^hCorelli Barnett describes a concerned von Moltke several weeks after Germany attacked France in 1914: "We must not deceive ourselves. We have had successes, but we have not yet had victory. Victory means annihilation of the enemy's power of resistance. When armies of millions of men are opposed, the victor has prisoners. Where are ours? There were some 20,000 taken in the Lorraine fighting, another 10,000 here and perhaps another 10,000 there (he considers these to be low). Besides, the relatively small numbers of captured guns shows me that the French have withdrawn in good order and according to plan." The Swordbearers, p. 73.

same--search for indications that the enemy has lost the will to fight. The high number of Iraqi prisoners and equipment captured by the coalition forces in Desert Storm is a premier example.³²

To be sure, the will of the commander is a crucial ingredient in preserving the fighting spirit of any unit or army. When one reads the accounts of the great operational generals, one discovers that they discuss it in detail. Field Marshall von Manstein, an operational master, describes will from his perspective as the German 11th Army commander in Crimea:

*"This was the hour that usually comes sooner or later in such a contest, when the outcome of the battle is on the razor's edge. It was the hour that must show whether the will of the attacker to exert himself to the very limit of physical endurance is stronger than that of the defender to go on resisting. The struggle of deciding whether to call for a last supreme effort, at the risk of having ultimately demanded all that sacrifice in vain, is one that only can be fought out in the heart of the commander concerned."*³³

Curiously, however, even von Manstein, whose brilliant victory in the Kharkov campaign was designed to capitalize on the Russians exceeding their culminating point, does not tell how to identify it. He merely states, "I doubt if there is anything harder to learn than gauging the moment when a slackening of the enemy's resistance offers the attacker his decisive chance."³⁴

Resolve and fortitude weigh heavily in preserving the moral dimension of an army. A characteristic George Patton proclaimed, "There can never be a defeat if man refuses to accept defeat. Wars are lost in the mind before they are lost on the ground."³⁵ But perhaps the most adamant perspective on morale and the will of the commander (in answering, perhaps, the question of how one knows he is winning) is the guidance from Marshall Foch, the French Commander in Chief of Allied Forces on the Western Front in WWI: "A battle won is a battle in which one will not confess oneself beaten."³⁶ Sadly for many generals who subscribe blindly to Foch's views, there is also a physical dimension to the culminating point--a "hard deck"--which

resolve and fortitude cannot counter.

THE PHYSICAL DOMAIN

*"Confidence in one's plans is not a fault, but it must be balanced with an honest acceptance of capabilities. In these three battles (of El Alamein, Kharkov 1943, and the Bulge)...commanders intentionally disregarded or overlooked supply problems, force ratios, troop conditions, enemy capabilities, and subordinates' views, all facts known beforehand, and expected their military genius and a cooperative enemy to bring victory....These three commanders were still giving orders to attack when their units were already too weak to defend."*³⁷

If the moral domain represents the art of war, then the physical domain more or less represents the science of war. Regardless of the iron will of the commander and the resolve of his troops, there are tangible indicators--the realm of the physical--which offer concrete clues about the tide of the battle. These provide a sort of battle calculus to the commander, particularly if he is well served by his staff. At the operational level the staff plays a significant role given the dimensions of the theater battlespace. Probably the two most important components of this battle calculus are correlation of forces and logistics.

The former requires some sort of realistic assessment of combat power for each side, a particularly challenging task which demands much of the intelligence officer. There are a variety of methods of calculating force ratios, from the quick to the excruciatingly detailed. FM 100-5 describes four elements of combat power (firepower, maneuver, protection, and leadership) which serve as useful tools for such assessments. On the other extreme, numerous computer models exist which overlay combat power figures on assigned units on both sides. The former Soviet

Army was particularly detailed in employing its normative laws and rules--more a science than an art--to plan operations and anticipate key events. What is important is to select a tool that works for the campaign in question, ascribe as accurate a set of figures as possible, reassess continuously as the operation unfolds, and avoid becoming so enamored with one's calculations that valid judgment falls victim to numbers. Critical to identifying the culminating point in this manner is a clear appreciation of the center of gravity of each side. Additionally, the *rate* of net losses relative to the enemy bears assessment. Ultimately the attacking general must continuously ask himself if he has the combat power to assume an effective defense if he truly reaches his culminating point.ⁱ

Particularly at the operational level of war, logistics is a critical ingredient in identifying success or failure. In many respects the logistician determines what can or cannot be accomplished, and the general who does not heed may miss his culminating point entirely. Joint Pub 3-0 clearly advises, "Synchronization of logistics with combat operations can forestall culmination and help commanders control the tempo of their operations."³⁸ Indeed, in the realm of the operational level of war, the operational pause (particularly as a logistical requirement) presents a vexing but fundamental challenge to the commander who wants to press his attack but realizes he may culminate if he does so. Furthermore, this notion of the operational pause is evidence that as campaigns grow larger, few armies will be defeated in an afternoon; campaigns will be extended spatially and temporally, and they will ebb and flow before the final victor--and culminating point--becomes clear.

In the three campaigns cited at the beginning of this section, the losing commanders all

ⁱ Another model for assessing combat power is the use of the major operational functions: intelligence, maneuver, fires, sustainment, and deception. While subjective in nature, they do offer distinct vantage points similar to the seven tactical battlefield operating systems.

ignored the physical constraints of the battlefield and passed their culminating points. Perhaps the Karkhov campaign of WW II offers the most salient indices of the turning point. In early 1943 the Soviets began a great offensive campaign against the German Army Group South. In the event, the Russians had two problems: their own significant errors and the brilliant counterstroke waged by von Manstein, a counterstroke designed to hit the Russians after they had passed their culminating point. In fact, Manstein not only anticipated--expected--the Russians to advance too far, he expedited it, giving ground while directing aviation and special operations troops against the critical Russian supply nodes until the Red Army far exceeded the point of culmination..

Soviet Group Popov began the offensive with a weak logistical situation which only grew worse. Within three weeks, Popov reported that, "...all he had left was a handful of tanks with no fuel, no ammunition, and no food. The Front's response was to keep moving and destroy the enemy."³⁹ Furthermore, the Soviets were so confident, they kept no operational reserves; they didn't reorganize depleted units; in Clausewitzian order, they had to use considerable combat units to hold the flanks as they progressed west; and they totally misread the Germans by assuming they were retreating when in fact Manstein was luring them further and further along. Most damning was the assessment that Soviet confidence was so great (particularly due to Manstein's retrograde) that "...commanders from Stalin to Corps were so biased by (their perceived success) that they ignored, misread, or would not accept intelligence indicators or reports from subordinates presenting any other conclusion." Jim Coomler concludes his study of these three campaigns with the observation that while the defender can cause a culminating point, the attacker more often brings about his own due to overconfidence or stubbornness.⁴⁰

A battlefield assessment of enemy units and their condition is another indicator for the

operational commander who is keeping the battle calculus. In describing the Battle of Koeniggraetz, in which the Prussians soundly defeated the Austrians, Martin van Creveld writes that even late in the afternoon of that battle, von Moltke (the Elder) did not realize that he had defeated the entire Austrian Army and not just parts of it. Only the next day did the Prussian general realize the decisiveness of his victory--after he walked the field and identified the defeated Austrian units.⁴¹

Admiral Doenitz, the very capable German operational thinker who designed the U-boat campaign of WW II, had no trouble discerning his culminating point. His battle calculus was determined by his exchange ratio: the number of allied ships sunk versus U-boats sunk, and secondly the net loss or gain as more submarines were built. In December, 1941 the ratio was 13:1; by the end of 1942 it slipped to 10:1 (still good); but the March, 1943 figures dropped to 7:1; and finally by May it plummeted to less than 1:1. Doenitz did not understand the reason for these low ratios (really coming from several allied technological and tactical innovations), but he understood the mathematics. He recalled his U-boats from the Atlantic while he pondered his next strategy.⁴²

In a more recent maritime campaign, the Battle of the Falklands, at least one Argentinian commander identified the culminating point well before the fighting was over--again through a battle calculus determined, in part, by logistics. On 1 April 1982 the Argentines began their invasion. By 30 April the British established a Total Exclusion Zone; two days later they demonstrated they could enforce it by sinking the *Belgrano*. The Argentines promptly sank several British ships with the few Exocet missiles they had available. On 15 May, the day British SAS troops landed in West Falklands and destroyed some Argentine ammunition, fuel, and

aircraft, Vice Admiral Lombardo advised the military junta that they should sue for peace. "He cited lack of food, lack of equipment, lack of ammunition, lack of logistic support, and cold weather...and the troops (on the islands) were starving." This dire logistical situation, coupled with the recognition that it would only get worse as the British Navy controlled the sea lanes, was clear to Lombardo.⁴³

There are countless more examples of operational commanders who reached a culminating point and may or may not have seen the physical signs that the battle or campaign was decided. Rommel, Popov (or his superiors, at least), Hitler, and the Argentine junta didn't see it. Manstein, Doenitz, and Lombardo did. And Moltke needed a little Monday morning assurance. The strongest signal was logistical, but a battle calculus of force ratios was also clearly evident.

THE INTENTIONS

"...it was still not clear whether the enemy would admit his defeat or try to continue his tough resistance further back. In such situations there tends to be a complete lack of intelligence on a vital question like this. A veil of uncertainty--the one unvarying factor in war--had descended on the enemy's location and intentions.... The field commander whose reaction here is to wait for unimpeachable intelligence reports to clarify the situation has little hope of being smiled upon by the Goddess of War."

von Manstein
France, 1940⁴⁴

Clausewitz's third indicator of victory was the enemy giving up its intentions. In its simplest form it is surrender; it could also be ceasing the fight or yielding ground. In a way, this clue is embedded in the other two categories--the moral and the physical. It could also arise from a realization, from either side, that a center of gravity is lost or is about to be. It is fundamentally

about initiative, however, the ability to set the terms of the fight, whether offensive or defensive. According the Mao Tse Tung, "Freedom of action is the very life of an army and, once it is lost, the army is close to defeat or destruction."⁴⁵ Initiative is the third key.

In that regard, this indicator begs the question, "Have I done what I want, and have I prevented the enemy from doing what he wants?" It appears that this perspective tracks with the opinion of Admiral Joseph Wylie when he proposed there are two types of strategies--cumulative and sequential. The former, a style of exhaustion or even the "death of a thousand cuts," is typical of naval combat and is likely also for air warfare. It is difficult to judge progress in a cumulative strategy.

On the other hand, he states that sequential strategy, "a series of visible, discrete steps, each dependent on the one that preceded it," is easier to gauge. "We are able, with some degree of accuracy, to predict in advance the outcome of the sequential strategy. We are not able...to predict the compounding effect of cumulative strategy...."⁴⁶ It seems that the likely explanation centers on initiative. In a sequential strategy, like MacArthur's island-hopping campaign, one can gauge his progress on how he fares according to *his* plan and initiative. In a cumulative strategy, one speculates about the effects of the campaign on the *enemy's* plan--difficult at best.

COL Huba Wass de Czege, author of the Army's 1982 and 1986 FM 100-5, writes that, "AirLand Battle addresses 'winning' engagements, and battles, in the context of major operations and campaigns appropriate to strategy and policy. The aims of strategy and policy define 'victory' or 'winning' at operational or tactical levels."⁴⁷ In the final analysis, perhaps this is the only sure way of identifying victory at the operational level of war--by achieving the stated aims of policy and strategy. If so, it squares with the notion that winning or losing at the operational level is

temporary; it has "interim culminating points" as the campaign ebbs and flows, but there likely will be no single, irreversible culminating point--until the proverbial fat lady finally sings and the war goals are met or lost for good. This would explain the back and forth operations between Rommel and the British in North Africa, Marshall Pilsudsky and the Russians in Poland, and the French and the Germans in both World Wars. Maybe you don't "win" at the operational level, but you can culminate, perhaps over and over again until strategy prevails. Maybe that's all you should expect at the operational level.

CONCLUSION

*On the British attack at the Somme, July 1914, and the consequences of a command and control system placing commanders far to the rear: "...superior headquarters failed to realize the magnitude of the defeat either on this or on the following days; there is nothing in either Haig's or Rowlinson's (4th Army commander) diary to indicate that they had an inkling of having at their hands one of the worst catastrophies to befall an army in the entire history of war."*⁴⁸

This study began by asking the question, "How do you know you've won or lost the battle or campaign?" When, indeed, is it decided? It accepted the proposition that the culminating point offered the best indicator of victory or defeat, but that begged a second question: How do you identify the culminating point?

Our doctrinal manuals offer little help. They strongly endorse the culminating point, but despite the rhetoric, they don't explain how to identify it. The study reverted back to theory, and particularly Clausewitz, for further clues. In On War, he suggests that you can identify victory in three ways: loss of material (physical), loss of morale (moral), and loss of intentions (giving up).

Dr. Schneider, a present day theorist, has a model of combat decay of units which fully complements Clausewitz's moral dimension and supports Clausewitz's promotion of prisoners and guns as a battlefield indicator. We can see these qualifiers played out in numerous historical battles discussed herein (and many more left unmentioned). There are indicators of the culminating point, but one must accept them holistically (the moral, the physical, and intentions) so as not to be falsely swayed by one set but not the other.

But make no mistake--the culminating point is very difficult to see, and one might *never* identify it at the exact point of decision. That is why seeking the culminating point is both an art and a science.

That does not absolve commanders and staffs from *planning* for it, seeking ways to *create* it, finding ways to *identify* it, and *capitalizing* on it. Clausewitz's *reasons* for the culminating point provide good clues for the staff planner in this regard. One really should ask, "When am I winning or losing?" before the battle begins, and naming the "end state" is but one component of the answer.

Furthermore, staff officers and commanders need to conduct continuous assessments to determine their posture *vis-a-vis* the enemy and gauge their relationship (and the enemy's) to the culminating point. Intelligence officers (J2's and G2's) have a crucial role here; they must support the commander and the operators. Intelligence, not just information, is essential.

Operational pauses are not just permissible; they are mandatory for campaigns and major operations. There are many facets to the operational pause, but logistics is often the most important. Commanders, whose normal tendency is--and must be--to press victory to the fullest, must be completely cognizant of how operational sustainment can affect the ultimate outcome.

Operational pauses must be thought through in advance.

It also appears, as Navy Captain Tom Gallagher believes, that the *loser* decides when the war is over. This was true in antiquity, and it remains true today. Not only does the loser decide when the fight will stop, it is the *loser* who sends the signals that the culminating point is nigh and the battle is decided. At least that's how the indicators of winning and losing appear. If so, then the losing commander identifies the culminating point (or some point past it) or he decides that the costs over gains aren't worth continuing. Perhaps he realizes that the losing slope is irreversible. The winning side merely creates the situation, but it cannot decide.

Finally, the commander must go where he can "see" the culminating point. Since we have seen that this entails a moral as well as a physical dimension, the task is a difficult one. That is one reason why generalship, with its operational or strategic perspective in the realm of the uncertain, demands genius.

*"Thousands of wrong turns running in all directions tempt his perception; and if the range, confusion, and complexity of the issues were not enough to overwhelm him, the dangers and responsibilities may. That is why the great majority of generals will prefer to stop well short of their objective rather than risk approaching it too closely, and why those with high courage and an enterprising spirit will often overshoot it and so fail to attain their purpose."*⁴⁹

ENDNOTES

1. William Shakespeare, "The Life of King Henry the Fifth," in Shakespeare, the Complete Works ed. G.B. Harrison (New York: Harcourt, Brace & World, 1968), p. 764.
2. F.E. Adcock, The Greek and Macedonian Art of War, (Berkeley: The University of California Press, 1967), p. 7. In discussing the Greek tactics, Adcock says, "It would have seemed to the Greeks of this age folly not to know when you were beaten....It was the convention for the vanquished to admit defeat by sending heralds to ask leave to collect their dead for burial."
3. Paddy Griffith, Forward Into Battle, (Novato, CA: Presidio Press, 1991), p. 30.
4. Carl von Clausewitz, On War, Trans. Michael Howard and P. Paret, (Princeton, NJ: Princeton University Press, 1984), p. 252.
5. Ibid., p. 231. Clausewitz advises that, "The really crippling losses (to the enemy), those the vanquished does not share with the victor, only start with his retreat....Thus a victory usually only starts to gather weight after the issue has already been decided...."
6. Ibid., p. 570. Clausewitz also advises that, "While one man may lose his best chance through timidity and following so-called orthodox procedures (the one who stops his attack early), another will plunge in head first and end up looking as dazed and surprised as if he had just been fished out of the water (the one who passes the culminating point)."
7. Ibid., p. 240.
8. FM 100-5 Operations, (Washington, DC: US Government Printing Office, 1986), p. 181. This definition is similar to that found in Joint Pub 5-00.1: "The point in time and space at which an attacker's combat power no longer exceeds that of the defender, and the attacker greatly risks counterattack and defeat, and continues the attack only at great peril." (Glossary, p. 5).
9. George M. Hall, "Culminating Points," Military Review, July, 1989. p. 85.
10. Clausewitz, p. 528.
11. M.N. Vego, "Operational Leadership," unpublished draft material in NWC 4001 for the Naval War College, Newport, RI, 21 March, 1995, p. 11.
12. Joint Pub 3-0, Doctrine for Joint Operations, (Washington, DC: CJCS, 9 Sep 1993), p. III-31.
13. Ibid., p. IV 24.
14. Ibid., p. IV 24.

15. Joint Pub 5-00.1, JTTP for Campaign Planning, First Draft, (Washington, DC: CJCS, 30 Jun 1994), p. II-3.

16. *Ibid.*, p. IV-7.

17. FM 100-5, Operations, 1986, p. 181. These are similar to Clausewitz, who says there many advantages to the attacker: the defender usually suffers higher losses, the defender loses fixed resources and the attacker doesn't, the defender loses ground and resources, the attacker gets to use those resources, the defender loses cohesion, the defender may lose allies and some may switch to the attacker, and the defender may become discouraged. On the other hand, the attacker had disadvantages as well: he must use forces to besiege or attack forts, he is in a hostile environment, his LOCs are longer while the defender's grow shorter, the defender may gain new allies due to the desperate situation, and the defender may increase his efforts. Clausewitz, pp. 566-567. Later he summarizes the advantages of the defender: "1. The utilization of terrain. 2. The possession of an organized theater of operations. 3. The support of the population. 4. The advantage of being on the waiting side." Clausewitz, p. 571.

18. FM 100-5, Operations, (Washington, DC: US Government Printing Office, 1993), p. 7-9.

19. *Ibid.*, p. 7-9.

20. Clausewitz, p. 383.

21. *Ibid.*, p. 231.

22. *Ibid.*, p. 231.

23. *Ibid.*, p. 249.

24. *Ibid.*, p. 232.

25. *Ibid.*, p. 241.

26. *Ibid.*, p. 250.

27. *Ibid.*, p. 234

28. *Ibid.*, 234.

29. Generaloberst Lothar Rendulic, "The Command Decision," Unpublished manuscript prepared for Headquarters European Command, Office of Chief Historian, 1947. Quoted in The Art of Winning Wars, COL James Mrazek (New York: Walker and Company, 1958). p. 177.

30. James Schneider, "Notes on the Foundations of Military Theory and Doctrine," course material for the School of Advanced Military Studies, USACGSC, Fort Leavenworth, KS, p. 41.5

31. Ibid., p. 50.

32. Another great example of a force in disintegration is described by Michael Howard in The Franco Prussian War (p. 179). Although the Germans won, not all units were successful. "The French at Point du Jour had seen the helmets of II Corps gleaming in the evening sun as they advanced over the Gravelotte plain, and knew what to expect. As the Prussians attacked, the whole firing-line sprang into life, and Steinmetz's last onslaught was met by fire at point-blank range. The German infantry reeled back; in the ravine some of the horses crammed on the narrow road began to bolt; and the sudden tension which had sustained the Germans snapped altogether. Squadrons of cavalry, teams of gun-horses went careering back through Gravelotte, and the infantry, too long patient under the French shells, ran shrieking with them in a ragged howling mass out of the ravine, through the flame-lit village streets under the astounded eyes of the Supreme War Lord, shouting 'We are lost!' Staff officers, the King himself, weighed in cursing with the flat of their swords, but the flood of men swept on to Rezonville before it halted....Now if the French had attacked...they might have thrown the First Army into disorder, and isolated the Second. But no attack was made. On the French side only one brigade seems to have known of the German repulse...."

33. Erich von Manstein, Lost Victories, (Novato, CA: Presidio Press, 1982), p. 220.

34. Ibid, p.188.

35. Porter B. Williamson, Patton's Principles, (New York: Simon and Schuster, 1979), p. 129.

36. Hew Strachan, European Armies and the Conduct of War, (Winchester, MA: Allen and Unwin, 1983), p. 105.

37. James Coomler, "The Operational Culminating Point--Can You See It Coming?" Unpublished monograph, (Fort Leavenworth, KS: US Army Command and General Staff College, 16 May, 1986), p. 24.

38. Joint Pub 3-0, p. III-29.

39. Coomler, p. 14.

40. Ibid., p. 16. In these three campaigns, Coomler identifies events or factors which caused the culminating point:

	Rommel: El Alamein	Vatutin: Kharkov	Hitler: The Bulge
Expectation of decisive results	X	X	X
Overconfidence	X	X	X
Cdrs didn't listen to subordinates		X	X
Subordinates approved cdr's plan	X	X	
Cdr's stubborn commitment to go forward	X	X	X
No option; had to attack	X		X
Thought enemy weak or retreating	X	X	X
Cdr had no desire to go to defense	X	X	X
Cdr recognized culminating point too late	X	X	X
"Dazzling" maneuver plan	X	X	X
Few reserves	X	X	
Exhausted soldiers before attack	X	X	
Whole units destroyed in attack	X	X	
Breakdown of intelligence collection	X	X	
Losses incurred made defense impossible	X	X	X
Logistical shortages	X	X	X
Logistical shortages evident beforehand	X	X	X
Long or difficult lines of communication	X	X	X
Shortage of transport assets	X	X	X
Not enough fuel & ammo to reach objective	X	X	X
Tactical defense of enemy	X	X	X

41. Martin van Creveld, Command In War, (Cambridge, MA: Harvard University Press, 1988), p. 139.

42. John Keegan, The Price of Admiralty, (New York: Penguin Press. 1988), p. 232.
43. "Falkland Islands Campaign - Understanding the Issues Vol I," Unclassified extract, (Fort McNair, Washington DC: National Defense University, Sep 1986), p.302.
44. von Manstein, p. 137.
45. Mao Tse Tung, "Selected Military Writings," Student text, (Fort Leavenworth, KS: US Army Command and General Staff College, 1993), p. 235.
46. Joseph R. Wylie, Military Strategy: A General Theory of Power Control, excerpts published in The Art and Practice of Military Strategy, ed. George Thibault, (Rutgers: The State University, 1967), p.201.
47. COL Huba Wass de Czege, "The Nature and Reasons for Changes in This Edition," unpublished memorandum for reviewers of FM 100-5, (Fort Leavenworth, KS: USACGSC, 1 July 1985), p. 4.
48. van Creveld, p. 164.
49. Clausewitz, p. 573.

BIBLIOGRAPHY

Books

- Adcock, F.E. The Greek and Macedonian Art of War. Berkeley: University of California Press, 1967.
- Barnett, Correlli. The Swordbearers. Bloomington: Indiana University Press, 1975.
- Blainey, Geoffrey. The Causes of War. New York: Free Press, 1988.
- Clausewitz, Carl von. On War. 8th ed. Trans. M. Howard and P. Paret. Princeton, NJ: Princeton University Press, 1984.
- Cooper, Matthew. The German Army: 1933-1945. New York: Stein and Day, 1978.
- Corbett, Julian. Some Principles of Maritime Strategy. Annapolis: Naval Institute Press, 1988.
- English, John A. On Infantry. New York: Praeger, 1984.
- Fuller, J.F.C.. A Military History of the Western World, Vol III. New York: Funk and Wagnalls, 1956.
- Griffith, Paddy. Forward Into Battle. Novato, CA: Presidio Press, 1991.
- Hastings, Max. Overlord: D-Day and the Battle for Normandy. New York: Simon and Schuster, 1984.
- Herzog, Chaim. "A Military-Strategic Overview" in The Iran - Iraq War: Impact and Implications, ed. Efraim Karsh, 260-266. Jaffee Center for Strategic Studies, Tel Aviv University: St. Martin's Press, 1989.
- James, D. Clayton. The Years of MacArthur, Vol III. Boston: Houghton Mifflin, 1985.
- Keegan, John. The Price of Admiralty. New York: Penguin Press, 1988.
- Liddell Hart, B.H. Strategy. excerpts reprinted in The Art and Practice of Military Strategy, ed. George Thibault, London: Faber and Faber, Ltd.. 1954.
- Manstein, Erich von. Lost Victories. Novato, CA: Presidio Press, 1982.
- Marshall, S.L.A. Men Against Fire. Gloucester, MA: Peter Smith, 1978.
- Ropp, Theodore. War in the Modern World. New York: Collier, 1959.

- Shakespeare, William. "The Life of King Henry the Fifth," in Shakespeare, the Complete Works, ed. G.B. Harrison, 732-772. New York: Harcourt, Brace & World, Inc., 1968.
- Slim, Viscount William. Defeat Into Victory. 2nd ed. London: Cassell and Company, 1956.
- Strachan, Hew. European Armies and the Conduct of War. Winchester, MA: Allen and Unwin, 1983.
- van Creveld, Martin. Command in War. Cambridge, MA: Harvard University Press, 1988.
- Weigley, Russell. Eisenhower's Lieutenants. Bloomington: Indiana University Press, 1981.
- Williamson, Porter B. Patton's Principles. New York: Simon and Schuster, 1979.
- Wylie, Joseph R. Military Strategy: A General Theory of Power Control. Excerpts published in The Art and Practice of Military Strategy, ed. George Thibault, 196-203. Rutgers: The State University, 1967.

Periodicals and Articles

- Hall, George M. "Culminating Points." Military Review, July, 1989, pp. 79-86.
- Kipp, Jacob. "Barbarossa and the Crisis of Successive Operations: The Smolensk Engagements, July 10-August 7, 1941." The Soviet and Post Soviet Review, 19, no's 1-3, 1992, pp. 91-135.
- Warden, John III. "Employing Air Power in the Twenty-first Century" in The Future of Air Power in the Aftermath of the Gulf War, ed. Richard H. Shultz, Jr. and Robert L. Pfaltzgraff, Jr., 57-82. Maxwell Air Force Base, AL: Air University Press, July, 1992.

Government Documents

- Department of Defense. "Appendix O, The Role of the Law of War" in Conduct of the Persian Gulf War: Final Report to Congress. Washington, DC: Government Printing Office, April, 1992.
- National Defense University. Falkland Islands Campaign--Understanding the Issues Vol. I

(Unclassified extract). Fort McNair, Washington, DC: September, 1986.

Office of the Chairman, Joint Chiefs of Staff. Joint Pub 3-0, Doctrine for Joint Operations.
Washington, DC: 9 September 1993.

_____. Joint Pub 5-00.1, JTTP for Campaign Planning, First Draft. Washington, DC: 30 June 1994.

U.S. Army. FM100-5 Operations, Headquarters, Department of the Army, Washington, DC, 1986.

_____. FM100-5 Operations, Headquarters, Department of the Army, Washington, DC, 1993.

Unpublished Papers

Benjamin, David. "Prerequisite for Victory: The Discovery of the Culminating Point." Unpublished monograph, US Army Command and General Staff College, Fort Leavenworth, KS: 13 May 1986.

Coomler, James D. "The Operational Culminating Point--Can You See It Coming?" Unpublished monograph, US Army Command and General Staff College, Fort Leavenworth, KS: 16 May 1986.

Franklin, Charles D. "Time, Space, and Mass at the Operational Level of War: The Dynamics of the Culminating Point." Unpublished monograph, US Army Command and General Staff College, Fort Leavenworth, KS: 28 April 1988.

Hejlik, Dennis J. "Recognizing and Controlling the Culminating Point at the Operational Level of War." Unpublished research paper, Naval War College, Newport, RI: 17 May 1993.

Mao Tse Tung, "Selected Military Writings." Student text, Command and General Staff College, Fort Leavenworth, KS: 1993.

Schneider, James J., "Notes on the Foundations of Military Theory and Doctrine." Unpublished course material for the School of Advanced Military Studies, US Army Command and General Staff College, Fort Leavenworth, KS: 6 June 1994.

Vego, M.N. "Operational Leadership." Unpublished draft addendum to NWC 4001, Naval War College, Newport, RI: 21 March 1995.

Wass de Czege, Huba. "The Nature and Reasons for Changes in this Edition." Unpublished memorandum for reviewers of FM 100-5, US Army Command and General Staff College, Fort Leavenworth, KS: 1 July 1985.